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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,298	10/20/2003	Tommy Hsiao	184-P065DIC1	4293

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EXAMINER

RICHARDS, N DREW

ART UNIT PAPER NUMBER

2815

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/689,298	Applicant(s) HSIAO ET AL.	
	Examiner N. Drew Richards	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2005.  
2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-9 and 17-28 is/are pending in the application.  
4a) Of the above claim(s) 27 and 28 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1,3-9 and 17-26 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3-5, 7, 8, 17 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al. (USPAT 5482881, Chen).

With regard to claim 1, Chen discloses in figures 3 and 6 a method for providing a semiconductor memory device including a substrate (116) and at least one field isolation region (300). Chen discloses in figures 3 and 6 providing (450) a plurality of gate stacks (700) above the substrate, each of the plurality of gate stacks including a first edge and a second edge, each of the plurality of gate stacks crossing the at least one field isolation region (300). Chen discloses in figures 3, 6 – 6c, and 6f providing a source implant (458/670, DDI/MDDI, 112) adjacent to the first edge of each of the plurality of gate stacks. Chen discloses in figures 3, 6, and 6d driving (462) the source implant under the first edge of each of the plurality of gate stacks. Chen discloses in figures 3, 6, 6e, and 6f providing a drain implant (672, MDD2, 114,) after; the drain implant being provided in the substrate adjacent to the second edge of each of the plurality of gate stacks.

With regard to claim 3, Chen discloses in figures 3 and 6 – 6f wherein the source implant providing step includes the step of providing a first source implant (DDI) and a

second source implant (MDD1) adjacent to the first edge of each of the plurality of gate stacks. Chen discloses in figures 3 and 6 – 6f wherein the driving step includes the step of driving the first source implant and the second source implant under the first edge of each of the plurality of gate stacks.

With regard to claim 4, Chen discloses in figures 3, 6, 6b – 6d, and 6f further comprising the step of providing a first spacer and a second spacer (both formed of insulating layer 720) for each of the plurality of gate stacks, the first spacer being disposed along the first edge of each of the plurality of gate stacks, the second spacer being disposed along the second edge of each of the plurality of gate stacks.

With regard to claim 5, Chen discloses in figures 3 and 6 – 6a further comprising the step of providing a self-aligned source etch (454).

With regard to claim 7, Chen teaches wherein the drain implant (MDD2) is As (arsenic). Though not explicitly stated, it is implicitly understood that the drain implant is arsenic as Chen teach on the first paragraph of column 7 and on column 8 line 18 through column 9 line 9, that the same dopant is used for the MDD implants and that arsenic is used as the MDD implant dopant.

With regard to claim 8, Chen discloses in figures 3 and 6 – 6f and column 8, lines 19 – 52 wherein the second source implant is As.

With regard to claim 17, Chen discloses in figures 3, 6, and 6d wherein the step of driving the source implant under the first edge of each of the plurality of gate stacks comprises a thermal treatment (462).

With regard to claim 19, Chen discloses in figures 3 and 6 – 6f forming a gate stack. Chen discloses in figures 3 and 6 – 6f performing a source implant adjacent to a first edge of the stacked gate. Chen discloses in figures 3 and 6 – 6f heat treating the semiconductor memory so that the source implant diffuses under the first edge of the stacked gate. Chen discloses in figures 3 and 6 – 6f, after the source implant diffuses under the first edge of the stacked gate, performing a drain implant adjacent to a second edge of the stacked gate. Chen discloses in figures 3 and 6 – 6f the source implant extends further under the first edge of the stacked gate than the drain implant extends under the second edge of the stacked gate.

With regard to claim 20, Chen discloses in figures 3 and 6 – 6f wherein performing the source implant comprises performing a double diffused implant (DDI).

With regard to claim 21, Chen discloses in figures 3 and 6 – 6f wherein performing the source implant comprises performing a double diffused implant (DDI), and performing a moderately doped drain implant (MDDI).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 9, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (USPAT 5482881, Chen) as applied to claims 1, 3-5, 7, 8, 17 and 19-21 above, and further in view of Gardner et al. (USPAT 5953613, Gardner).

With regard to claim 9, Chen discloses in figure 6 oxidizing after the drain implant has been provided. It is not clear if Chen further teaches comprising the step of providing a rapid thermal anneal after the drain implant has been provided. Gardner further teaches in column 7, lines 49 – 52 comprising a step of providing a rapid thermal anneal after a drain implant has been provided. It would have been further obvious to one of ordinary skill in the art at the time of the present invention to use the rapid thermal annealing step of Gardner in the method of Chen and Gardner in order to activate the drain dopants and remove crystalline damage as taught by Gardner in column 7, lines 49 – 52.

With regard to claim 24, Chen discloses in figure 6 oxidizing after the drain implant has been provided. It is not clear if Chen further teaches comprising the step of providing a rapid thermal anneal after the drain implant has been provided. Gardner further teaches in column 7, lines 49 – 52 comprising a step of providing a rapid thermal anneal after a drain implant has been provided. It would have been further obvious to one of ordinary skill in the art at the time of the present invention to use the rapid thermal annealing step of Gardner in the method of Chen and Gardner in order to activate the drain dopants and remove crystalline damage as taught by Gardner in column 7, lines 49 – 52.

With regard to claim 25, Gardner teaches in column 7, lines 48 – 52 where a rapid thermal anneal comprises heat treating a semiconductor memory in a furnace at a temperature of about 1000 degrees Celsius for about 10 seconds.

5. Claims 6 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as applied to claims 1, 3-5, 7, 8, 17 and 19-21 above, and further in view of Miyata (USPAT 5183773).

Chen discloses in figures 3 and 6 – 6f the semiconductor memory device and spacers. It is not clear if Chen teach wherein the semiconductor memory device further includes a periphery including a plurality of logic devices and wherein the spacer-providing step further includes the step of providing the first spacer and the second spacer concurrently with a plurality of spacers in the periphery of the semiconductor memory device. Miyata teaches in figures 3l – 3m wherein a semiconductor memory device (32) further includes a periphery (34 and 36) including a plurality of logic devices (33 and 35) and wherein a spacer (98) providing step further includes the step of providing a first spacer and a second spacer concurrently with a plurality of spacers in the periphery of the semiconductor memory device. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the peripheral logic devices and concurrent spacer forming step of Miyata in the method of Chen in order to save space on a mother board and therefore reduce costs of fabrication by further consolidating fabrication steps.

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6. Claims 22 – 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as applied to claim 19 above, and further in view of Shah et al. (USPAT 5065208, Shah).

Chen discloses in column 6, lines 64 – 67 wherein heat treating the semiconductor memory comprises annealing the semiconductor memory at a temperature of 1050 degrees Fahrenheit. Chen does not teach annealing at 900 degrees Celsius for about 40 minutes. Shah teaches in column 10, lines 33 – 37 wherein heat treating a semiconductor memory comprises annealing the semiconductor memory in a furnace at about 900 degrees Celsius for about 40 minutes. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the annealing of Shah in the method of Chen in order to drive an N type impurity of a source region under gate oxide as taught by Shah in column 10, lines 33 – 37.

### ***Double Patenting***

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).



8. Claims 1, 3, 4, 6 – 9, 17 – 19, and 24 – 26 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 – 5 of U.S. Patent No. 6,235,584.

As far as the examiner can ascertain the subject matter of claims 1 and 19 of the application are covered by claim 1 of the patent. The subject matter of claim 3 of the application is covered by claims 1 and 2 of the patent. The subject matter of claim 4 of the application is covered by claim 1 of the patent. The subject matter of claims 6 and 26 of the application are covered by claims 1 and 3 of the patent. The subject matter of claim 7 of the application is covered by claims 1 and 4 of the patent. The subject matter of claim 8 of the application is covered by claims 1 – 5 of the patent. The subject matter of claims 9, 24, and 25 of the application is covered by claims 1 – 5 of the patent. The subject matter of claims 17 and 18 of the application are covered by claims 1 and 2 of the patent.

9. Claim 5, 20, 21 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 – 5 of U.S. Patent No. 6,235,584 in view of Chen. It would have been obvious to have the additional features of a self-aligned source etch, DDI implant, and MDDI implant of Chen in the invention of U.S. Patent No. 6,235,584 in order to make a working device.

10. Claim 22 and 23 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 – 5 of U.S. Patent No.

6,235,584 in view of Shah. It would have been obvious to have the feature of annealing the semiconductor memory in a furnace at about 900 degrees Celsius for about 40 minutes of Shah for the heat treatment in the invention of U.S. Patent No. 6,235,584 in order to drive an N type impurity of a source region under gate oxide.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims 1, 3-9 and 17-26 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

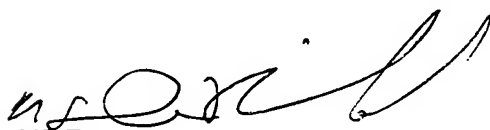
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (571) 272-1736. The examiner can normally be reached on Monday-Friday 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



NDR



GEORGE ECKERT  
PRIMARY EXAMINER